# INTERNATIONAL BIWEEKLY ONLINE SEMINAR ON ANALYSIS, DIFFERENTIAL EQUATIONS AND MATHEMATICAL PHYSICS

Coordinators: Prof. Alexey Karapetyants, Prof. Vladislav Kravchenko

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**23 March 2023, 6 pm (UTC+3)**

## A theory of reproducing Hardy and Bergman spaces in octonionic settings

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We intend present the theoretical fundament of octonionic Bergman and Hardy spaces of octonionic monogenic and slice monogenic functions. The non-associativity of the octonions implies that neither octonionic monogenic nor slice monogenic functions have the algebraic structure of an O-module. Consequently, there is no direct analogue of a Cauchy-Schwarz inequality neither a Fischer-Riesz representation theorem.
In the first part of the presentation we explain how some of the fundamental problems in defining a reproducing kernel can be overcome in the non-associative setting by looking at the real part of an appropriately defined para-linear octonion-valued inner product. Para-linearity replaces the property of being octonionic linear properly, since the latter is too strong in the non-associative setting.
Additionally, we shall see that the use of intrinsic weight factors is a further crucial ingredient in the non-asssociative case.
Both for the monogenic and for the slice monogenic case we present explicit formulas for the reproducing kernels for some concrete domains.

In this talk we present joint results with F. Colombo and I. Sabadini.

Main reference: F. Colombo, R.S. Kraußhar, I. Sabadini: Octonionic monogenic and slice monogenic Hardy and Bergman spaces, submitted for publication (February 2023).

*Seminar website: https://msrn.sfedu.ru/sl. The seminar uses Microsoft Teams online platform.
Please send questions to ademp.seminar@gmail.com (Tatiana Andreeva, scientific secretary).

The seminar is organized by the coordinators Alexey Karapetyants and Vladislav Kravchenko within the activities of the Regional Mathematical Center of the Southern Federal University in collaboration with Institute of Mathematics, Mechanics and Computer Sciences of the Southern Federal University and the OTHA research group in Operator Theory and Harmonic Analysis.

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